Weekly Report for 02/10/2014

Highlights

• Prepared and presented a talk (Alternate Lattice Performance) on Multi-Bend Achromat Beam Physics Design Review, February 13-14, 2014. (Yipeng Sun)

• Posted a new technical note: "Radiation heating for new 5-mm ID transitions." Noticed that the min horiz aperture of the transition is 13 mm, whereas that of the 4ID 5-mm chamber is nominally 15 mm. Followed up with the engineers and the physicists and made a recommendation to resolve the issues. (Kathy Harkay)

• Continued studies with J. Dooling of the SCU0 beam loss monitors (BLMs) when the beam is dumped with a S38 vertical scraper gap. Conclusion is that with a scraper gap 1-2 mm smaller than the ID4 chamber physical aperture, the SCU0 BLMs are reduced by 10-25%, but there is no obvious effect when the ID6 gap (or all ID gaps) are closed (i.e. little difference whether scraper gap is open or closed). (Kathy Harkay)

APS Renewal and Upgrade

• Prepared and presented a talk (Alternate Lattice Performance) on Multi-Bend Achromat Beam Physics Design Review, February 13-14, 2014. (Yipeng Sun)

• Developing APS upgrade lattice with off-axis injection (accumulation) (Yipeng Sun)

• Assisted Ju in ordering FID power pulser for kicker evaluation. (Chih-Yuan Yao)

• Prepared and attended APSU physics review meeting. (Aimin Xiao)

• Discussed FBII at SOLEIL in detail with R. Nagaoka. (Kathy Harkay)

• Discussed a paper on THz radiation with W. Guo, which is based in part on his synchrobetatron-kick scheme. (Kathy Harkay)

• Attended MBA upgrade physics review, and participated in a discussion of the closeout. (Kathy Harkay)

• Reviewed J. Carter's photon power results where he used CERN SynRad, and compared them to Cornell synrad3d results by A. Vella, L. Boon, and myself. I designed the benchmark case: a 6-mm ID chamber with a 5-mm-aperture photon absorber near the center in the MBA ring. (Kathy Harkay)

• Studied B. Yang's sdds codes for calculating incoherent x-ray scattering and tested its application to the SCU0 photon absorber case. He pointed me to his latest tcl version of the code, and we discussed what input parameters are needed for his code to convolve the single-photon result to a distribution on target. Thought about how to get this output from synrad3d. More work is to be done. (Kathy Harkay)

MCR Operations

Storage Ring Operations

• Installed most recent SR alignment data (2014.0001) (Louis Emery)

• Decided on allowing some steering in ID29 (IEX) in order to allow them to further commission their beamline. The steering limits should be of the order of the uncertainty on the P1 bpm offset measurement. (Louis Emery)

• With Sajaev found thatS5A:V3 glitching was the reason for three beam dumps. Punched it down, removed from RTFB and orbit correction and turned it off. Did some later orbit analysis of S5A:V3 glitches to determine the failure mode, and passed it on to PS group. (Louis Emery)

• Asked Dejus to generate the coefficients for power calculation of the ID35 undulator. Discussed with B. Yang and K. Schroeder possibly new limits for BPLD on ID35. The power calculated (R. Dejus) is very small (< 1 W), and thus BPLD limits there doesn't require re-evaluation. (Louis Emery)

• Discussed peak conditioning current for SR quads with PS group and MD design group. Updated the standardization parameters of quadrupoles to avoid further converter failures. (Louis Emery)

• On two occasions instructed operators to set a corrector in maintenance mode in order to reduce rms beam motion. On the first occasion received help from Sajaev. (Louis Emery)

• Made clean up plan for SR tune measurement system. (Chih-Yuan Yao)

• Troubleshooted and fixed a polarity problem of the repaired S35 amplifier. (Chih-Yuan Yao)

• Performed 3mm-thickness blade stripline kicker simulation in order to ease feedthrough interface. (Chih-Yuan Yao)

• Analyzed the SCU0 BLM data that J. Dooling recorded (he integrated the loss charge) for 4 unplanned beam dumps during operations (with ID gaps closed). The SCU0 quenched all 4 times. The upstream sum charge appears to have systematically increased for these dumps compared with earlier ones; changes in the beam orbit may be responsible. (Kathy Harkay)

• Investigated the reason why the SCU0 user could not set the main coil current after an unplanned beam dump on 2/12. Reviewed the APS Insertion Device Logs, and found that on that one occasion, the main coil current setpoint was changed before the main power supply remote interlock had cleared. Worked with M. Smith on a remedy: wait longer after turning the supply on. Also asked him to add confirmation in the log that the current readback is not zero after sending the set point. Sent D. Robinson an email summarizing the diagnosis and updates. (Kathy Harkay)

• Investigated beam losses. Found RF scope for some of the systems was not updated and passed information to RF group and DiMonte. (Karen Schroeder)

• Investigated beam motion reported by operators. (Karen Schroeder)

• Sent information to F.C. (Shane Flood) and 23-ID beamline personnel regarding the removal of X-ray BPMs at S23. S23ID:P1 was removed because at the upper limit where X-ray BPM was active it was reading erratic (+-200 um error) and causing motion. Explained the options of limiting the range if this turned out not to be an alignment issue. Passed information on to Sereno who was planning on doing the MOMBO gap scans and possibly some alignments during the 2-day study period. (Karen Schroeder)

• Noted BESOCOM trip during the reboot of iocinjtime. Talked to Pasky and sent Randy info to shut off low level RF for L1,2&3 as part of preboot instructions. (Karen Schroeder)

• Performed gaps scans during Users operations to restore the X-ray BPMs removed during steering at the request of a couple of a beamlines. (Karen Schroeder)

Booster Operations

• Attended an APS Booster Tunnel Leak Coordination Meeting at 9:00am on Wednesday, February 19, 2001 in Bldg. 401 Conference Room B4100. We reviewed the different group responsibilities during the February 24th and 25th intervention period to alleviate water leaking from elevated areas of the tunnel and standing water on the floor. (Stan Pasky)

• Updated the Booster RF AFG Reset/Restart instructions. (Stan Pasky)

PAR Operations

• Investigated and fixed a PAR bunch cleaning error that is due to a wrong connection of DS345 function generator. (Chih-Yuan Yao)

Linac Operations

• Updated the linac requal (Requalification) test. The linac requal will be completed with the ACO's during the Injector Studies. This requal process takes place every 2 years. (Stan Pasky)

ITS Operations

• Replaced the laser room scope, tekdpo7, with tekdpo9. Brought tekdpo7 to IT for repair; appears to be a hard drive failure. RAM was doubled to 1 GB and solid-state drive was added. H. Shang was able to configure tekdpo9 for waveform capture and analysis. (Jeff Dooling)

• Discussed with R. Flood the idea of an ITS manager. (Jeff Dooling)

Procedures

• Updated the linac requal (Requalification) test. The linac requal will be completed with the ACO's during the Injector Studies. This requal process takes place every 2 years. (Stan Pasky)

MCR Operations administrative/misc.

• Produced the downtime report for OPS Directorate. Attended OPS Directorate in place of Flood one of the two weeks. (Karen Schroeder)

• Steered 1-ID away from the BPLD limit during studies and sent information to beamline personnel on the amount steered. (Karen Schroeder)

• Updated machine operator aids, daily orders, timely orders and standing orders. (Karen Schroeder)

• Found alternate Zone A LOTO sheets had not been updated with SCU0 breaker information. Gave information to LaBuda who verified breaker and updated the LOTO sheets. (Karen Schroeder)

• Reviewed and approved non-RSS SR work requests. (Karen Schroeder)

APS Machine Studies

Storage Ring Studies

• Did high coupling studies with Sajaev and Xiao. We measured vertical beam size using orbit at scraper with moderate success. (Louis Emery)

• Reported problem with one cerenkov detector counter (S38) (Louis Emery)

• Measured tunes for several lattices saved over the last two weeks. The range in nux was 0.03, with no explanation found for the changes in nux. (Louis Emery)

• Reported above in machine studies meeting. (Louis Emery)

• Worked with M. Smith and B. Deriy on IEX reboot issues. (Aimin Xiao)

• Joined vertical beam size experiment with Vadim and Louis. (Aimin Xiao)

• Carried out measurements with J. Dooling of beam dump induced beam losses at SCU0 BLMs vs vertical scraper gap. J. Dooling analyzed the BLM signals and I summarized the results. We

presented the results at the weekly studies meeting. (Kathy Harkay)

• Conducted study with K. Harkay, again looking at beam loss in ID6. Recorded fast BLM signals while varying the vertical gap of the S38 scraper. (Jeff Dooling)

• Produced the beam related-portion of the machine studies schedule and updated the schedule as necessary. (Karen Schroeder)

• Assisted main control and controls with recovery from network storm which happened during studies. Discussed this further with Ken Sidorowicz who gave further information as to the cause and IT's solution. Passed the information on to Flood, who suggested it be brought up at OPS Directorate. (Karen Schroeder)

• Assisted MCR during non-beam studies as needed. (Karen Schroeder)

Booster Studies

• Discussed booster ramp power supply options with Sasha and Ju. (Chih-Yuan Yao)

• Continued I-ramp stuy with Hairong. We achieved ramp convergence for all but dipole magnets. (Chih-Yuan Yao)

PAR Studies

• Worked with Rob Keane expanded PTB and PAR current monitor range to >12nC for high charge studies. (Chih-Yuan Yao)

ITS Studies

• Assisted Terry Smith and Nick DiMonte with the Development, test & install ?software arc detector program? to trip L3 RF. This software will be used (only) during PCGun rf conditioning. (Stan Pasky)

APS Machine Research and Development

Storage Ring Research and Development

• Sent corrected email for Mohan for ID27 and ID35 beamline proposals. They are not moving safety shutters, we don't have to repeat tracking. (Louis Emery)

• Wrote Compton xbpm review for Mohan. (Louis Emery)

• Reading old papers on APS HOM dampers. Found updated monopole HOM data with dampers included for use of instability calculations. Since we don't have a complete set (with dipole HOMs) I will not include these better stability results in the MBA attice review. (Louis Emery)

• Realized from Harkay that the beam chamber for ID30 is planned to have a 26 mm full x-aperture instead of the expected 30 mm (as in ID4). A group of us is looking into this. (Louis Emery)

• Met with Y. Chae about new scraper design. (Louis Emery)

• Reported progress on AH4 conversion to Torres. (Louis Emery)

• Reading about delay differential equations, which may have applications with orbit correction. (Louis Emery)

• Discussed with D. Haskel on possibility of doing permanent swap-out injection with present APS magnets and present-emittance optics. This could allow small horizontal ID chambers. Just an idea. (Louis Emery)

• Analyzed the radiation heating for the new 5-mm ID transitions. Noticed that the min horiz aperture of the transition is 13 mm, whereas that of the 4ID 5-mm chamber is nominally 15 mm (per 1998 schematics). Followed up with the engineers and the physicists and made a suggestion that the horiz center line on the new S30 chamber be defined as the center of a 15-mm ellipse, not the max vertical aperture (latter apparently shifted by +2 mm in ID4). (Kathy Harkay)

• Reviewed the vacuum pressure history for the 2013 S37 horizontal scraper and sent J. Carter some data for his use in the 2014 scraper design vacuum analysis. (Kathy Harkay)

• Asked L. Boon to write a technical note on the SCU0 photon absorber and endbox heating with diffuse (elastic) photon scattering included, using the Cornell synrad3d code. Reviewed her draft note and made suggestions. (Kathy Harkay)

• Attended scraper meeting where it was revealed that surface contact between the insert and base would be poor and thermal conduction between the two could lead to a relatively high base temperature (rf and x-ray heating). This base temperature, added to a beam dump excursion could bring the total temperature over the melting point. (Jeff Dooling)

• Need firm force to hold the insert in contact with the base and raise the contact thermal conductance. Probably need to bolt down the insert to the base and use Au or Ag foil to aid contact. (Jeff Dooling)

Linac Research and Development

• Updated the default minor alarm limit for RG2 reflected power in the IOC database, L1:RFG:DC2BRF.HIGH from 200000 to 250000). (Stan Pasky)

ITS Research and Development

• ITS beamline was baked at 100 C for roughly 48 hours starting on Tuesday and ending on Thursday. A temperature of 55 C was maintained from mid-Thursday through mid-Friday. (Jeff Dooling)

• By the end of the week, the pressures had stabilized at 6e-9 T at the end of the straight beamline and 2.4e-8 T at the end of the bend beam line. (Jeff Dooling)

• Recorded uv beam images on the ITS alignment screen; illuminated screen uniformly for calibration. Issue with Test Stand rf triggering; beam at 4 Hz (Jeff Dooling)

• As the point of contact for the Injector Test Stand, I have been maintaining the schedule to help coordinate all work efforts. This also include reviewing and approving work request in this area. (Stan Pasky)

• Tested PMT (Photomultiplier tube) in ITS... (Stan Pasky)

APS Machine Software

AOP Applications Software

• Fixed an issue in OAGAnalogCheck because the L3:SM:SC1: HZ and VL power supplies. These have a unique measured current PV suffix. (Robert Soliday)

• Fixed an issue in OAGLSBCheck and OAGMSBCheck related to the L3:BM power supplies. (Robert Soliday)

Storage Ring

• fixed bugs in processing data collected by new method in SRCorrNoiseModel,. (Hairong Shang)

Injectors

• Updated various linac machine procedures affected by the PG1 power supplies being replaced with the PC1 power supplies. (Robert Soliday)

• Fixed a problem with the LPL_Configure machine procdure that resulted from having one less PS category than we had before. (Robert Soliday)

• Updated the ITS_SwitchToTestStand machine procedure to check if the ITS status is in beam permit mode. (Robert Soliday)

• continue testing Booster current ramp correction with CY. BM was unstable, found that the fitting range of BM is not complete due to slow motion of BM; modified the code to be able to fit all the range. ready for test next time. (Hairong Shang)

• called by operator to debug APSMpBRFStartUp pem, it turned out the the gun heater was not turned on. The PEM was fine. (Hairong Shang)

• added ITS PMT and bendline FC current data collection and display to AcquireITSWaveforms. (Hairong Shang)

General

• Sent Fystro an updated list of new runcontrols to be added to the alarm handler. (Robert Soliday)

• Fixed multiple cronjobs that were leaving files behind on /tmp. This was causing problems on nike. (Robert Soliday)

• Worked on elegant2ginger which converts the output from elegant into an HDF5 file which can be read by GINGER. This was requested by Bill Fawley (LBL) (Robert Soliday)

• Started work on sdds2hdf. This is a general purpose conversion tool which handles multipage parameters, arrays and columns. This was requested by Bill Fawley (LBL) (Robert Soliday)

• The laser room tektronics scope (tekdpo7) broke, current software AcquireITSWaveforms no longer worked because the replaced scope (tekdpo9) was not installed to IOC. Tried with different methods instead of EPICS to read scope data, and read the online program documentation of TDS5000B scope, finally with CY's help, I was able to read the scope data with VXI11 through ethernet after the VXI server starts on the scope. Later found out that we already agilent scope internet command (agilentcomm) which works for tecktronics scope too, wrote getTek5000BScopeData script to read scope waveform data using agilentcomm. With this script, we will be able to control tektronics scope directly through internet without EPICS. (Hairong Shang)

Simulation Software

• Updating program clinchor user's guide. (Louis Emery)

• Installed a new version of GdfidL. (Robert Soliday)

IOC/EPICS/Controls/Linux/Solaris/Linux Clusters/Data Loggers/Simulation software

• Updated the liquid nitrogen data logger based on input from Marty Smith. (Robert Soliday)

• Updated the linac test stand data logger per Yine's request. (Robert Soliday)

• Updated the cronjob that starts the data loggers. This solved a problem with the workstations

locking up at midnight occasionally. (Robert Soliday)

• Installed scalapack on orthros. (Robert Soliday)

• Installed the latest version of MVAPICH2 on orthros and rebuilt Pelegant. (Robert Soliday)

• Notified Sersted of a hardware problem on one of the execution nodes on the Orthros cluster. (Robert Soliday)

Web Site

• Maintained AOP wiki website, Next-Generation Storage Ring Meetings. (Yipeng Sun)

Meetings, workshops, conferences, committees, LMS related, and reviews

• Gave talk on multi-bunch instability to MBA lattice physics review. (Louis Emery)

• Submitted abstract to HiSOR user meeting. (Louis Emery)

• Attended POC-HP meeting (Louis Emery)

• Prepared presentation for APS-MBA upgrade physics review. (Chih-Yuan Yao)

• Tcavity / SPCGun meeting (Stan Pasky)

• Attended shutdown planning close-out meeting (Karen Schroeder)

Miscellaneous

• Prepared a talk "multibunch instabilities for MBA lattice" for the AOP group. (Louis Emery)

• Refereed paper for Review Scientific Instruments. (Louis Emery)

• Edited some parts of next-generation SR paper. (Louis Emery)

• Attended MBA beam physics meeting. (Louis Emery)

• Joined Vadim and Louis on investigation beam loss issues due to fault of S5A:V3. (Aimin Xiao)

• Serrved as tour guide for the annual Argonne IGED event, conducting four 20-min tours of the APS. (Kathy Harkay)

• Helped Weiming Guo (BNL) extract RPM contents when on a computer he does not have administrator privileges. (Robert Soliday)

• Helped Fryderyk Melka (NSRC Solaris) with SDDS in Matlab. (Robert Soliday)

• Helped Anthony Andrews (Idaho State Univ) build SDDS on Linux. (Robert Soliday)

• Sick day - 17th (Stan Pasky)

• Starting communication with SLAC for obtaining one of their operational SLED's for the linac. (Stan Pasky)